

## FEATURE ARTICLE

# Introduction to B-Cell Disorders

Kimberly Noonan, RN, AOCN®

Healthcare professionals have a good understanding of B cells in normal immunity. Although the role of lymphocytes and the lymphoid system in lymphoma is understood, the role of B cells is less clear in several autoimmune diseases, such as rheumatoid arthritis, idiopathic thrombocytopenic purpura, and autoimmune hemolytic anemia. This article will present an overview of malignant and nonmalignant B-cell disorders. Experts hypothesize that some monoclonal antibodies can deplete the B-cell population and prevent B- and T-cell responses in autoimmune diseases. Nurses should understand the data surrounding monoclonal therapy, which are not always presented clearly. Nurses' ability to interpret data is important to their patients and colleagues.

**T**he understanding of B cells in normal immunity has grown. Unlike the role of lymphocytes and the lymphoid system in lymphoma, the role of B cells is less clear in several autoimmune diseases, such as rheumatoid arthritis (RA), idiopathic thrombocytopenic purpura (ITP), and autoimmune hemolytic anemia (AIHA). This article will present an overview of malignant and nonmalignant B-cell disorders. In the second article in this supplement, "Treatment Approaches and Nursing Applications for Non-Hodgkin Lymphoma (NHL)," Jennifer M. Long, APRN, will focus on treatment options for NHL. The third article, written by Amy Goodrich, CRNP, will present "Emerging Therapeutic Options for B-Cell Disorders," discussing ITP and chronic lymphocytic leukemia (CLL). The articles will provide a foundation for the final article, "Cytokine-Release Syndrome," written by Sheila Breslin, RN, MS.

## B-Cell Development

Lymphocytes are the main cells involved in the immune system. The two types of lymphocytes are B cells and T cells. T lymphocytes are needed for cell-mediated immunity. T lymphocytes activate other T and B cells and often are associated with delayed hypersensitivity and graft rejection. B lymphocytes are responsible for humoral immunity. Humoral immunity is an essential function of immunity; it eliminates bacteria, prevents viral infections, neutralizes bacterial toxins, and plays an important role in certain allergic reactions (Sommers, 2005). An important role of B lymphocytes in the immune system is to produce antibodies. Figure 1 demonstrates the development of a B cell. B lymphocytes begin as stem cells found in the bone marrow. The stem cells develop into immature pro B cells, followed by pre B cells, immature B cells, and finally mature B cells.

Lymphocytes recognize and respond to foreign antigens. A subset of cell surface molecules or antigens is found on the surfaces of leukocytes and can be recognized by a specific set of antibodies.

### At a Glance

- ◆ Understanding of the pathophysiology of immunity and the importance of T and B cells in autoimmune diseases has grown.
- ◆ Nurses should be familiar with nonmalignant B-cell disorders and standard treatment options as well as new approaches for patients with nonmalignant B-cell disorders.
- ◆ Malignant B-cell disorders include chronic lymphocytic leukemia, Waldenstrom macroglobulinemia, and non-Hodgkin lymphoma, and this article discusses treatment options for each disease.

The cell surface molecules or antigens are called cluster of differentiation. Cluster-of-differentiation status plays an important role in identifying and differentiating the diagnosis of lymphoma and many other malignancies. Most B lymphocytes beyond the pro lymphocyte (not including plasma cells) are CD20+ (Dorner, 2006).

### The Role of B Lymphocytes in B-Cell Disorders

The role of B lymphocytes in B-cell disorders is complex. B cells are essential to regulate the immune system. They are antibody producing and are responsible for autoantibodies that are directly or indirectly destructive (Robak, 2004). B cells

Kimberly Noonan, RN, AOCN®, is a nurse practitioner at Dana-Farber Cancer Institute in Boston, MA. She is a speaker for Biogen Idec and Genentech, Inc. Mention of specific products and opinions related to those products do not indicate or imply endorsement by the *Clinical Journal of Oncology Nursing* or the Oncology Nursing Society. (Submitted July 2006. Accepted for publication December 12, 2006.)

Digital Object Identifier: 10.1188/07.CJON.S1.3-12